CALIFORNIA DIVISION OF MINES AND GEOLOGY

FAULT EVALUATION REPORT FER-112

SUPPLEMENT NO. 1

June 23, 1981

1. Fault. Las Positas (south branch).

2. Field Observations.

On June 23, 1981, in the company of David L. Carpenter (Lawrence Livermore Laboratory) and Darrel Herd (U.S. Geological Survey), this writer briefly observed a steeply-dipping, N60° E-trending fault in Livermore Gravels of Plio-Pleistocene age. The fault is exposed in road cuts on both sides of Greenville Road. The late Pleistocene gravels that cap the Livermore Gravels also appear to be offset 2 to 4 feet (south side down) in the west road cut. Parallel to the exposed fault and 5 to 10 feet to the south, a zone of 3 or 4 right-stepping cracks were observed in the asphalt concrete of the paved road. The cracks were relatively fresh and apparently formed during the last month or two, although minor previous cracking was suggested at the centerline of the road. The individual cracks trend about N30-40 E. No displacement could be measured, but the zone of en echelon cracks strongly suggest minor (perhaps 1 or 2 mm) left-lateral faulting.

The crack zone and the exposed fault generally align with a south facing scarp (or break in slope) to the west of the road. This geomorphic feature was mapped by Darrel Herd (1977) and Theodore C. Smith (FER-112, Fig. 3A). No further observations were made by this writer.

8. Seismicity.

According to Ellsworth and Marks (1980), the south branch of the Las Positas fault lies just north of a cluster of earthquakes recorded during 1969 to 1979 (see Fig. 5 of FER-112) and the January 1980 Livermore Valley earthquake sequence (see Fig. 8, attached).

9. Conclusions.

Based on these observations, and on the work of Herd and Smith, it appears likely that the south branch of the Las Positas fault is historically active. This is also suggested by recent seismicity just south of the fault. However, the observed cracks are very minor and could be due to causes other than tectonic faulting, (e.g., differential subsidence along an existing fault as a result of groundwater withdrawal).

10. Recommendations.

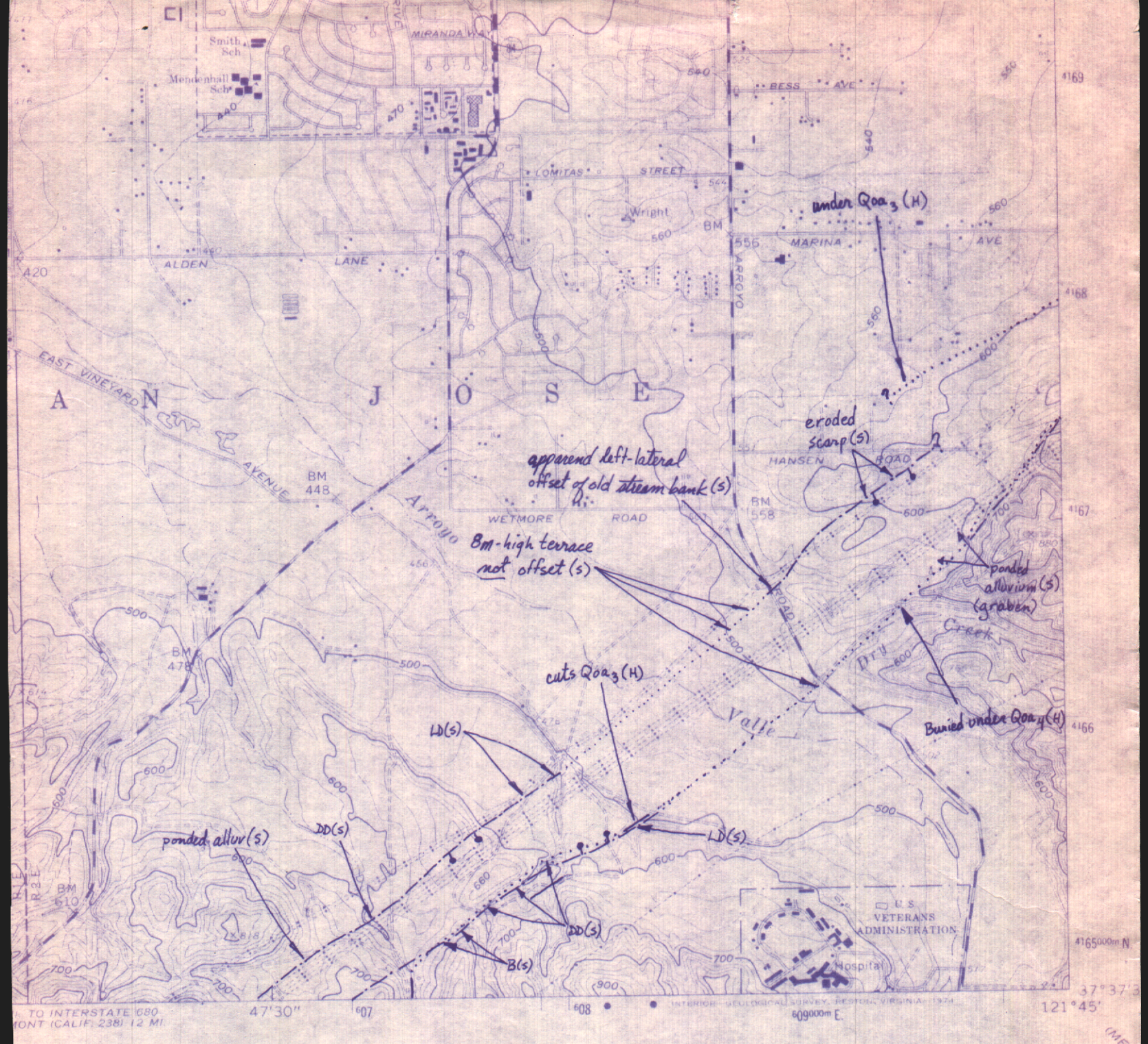
It is recommended that the south branch of the Las Positas fault (solid trace of Herd) be zoned because it meets the criteria for zoning (Hart, 1980, p. 5-6). It apparently is historically active (although movement is minor) and it is at least locally well-defined. As the proposed zone maps are in the process of being reproduced and distributed for review, it is recommended that these changes appear on the Offical Map of Special Studies Zones.

11. Report prepared by E.W. Hart, 6/23/81.

Earl W. Hart

EARL W. HART
Senior Geologist

EWH/map



FER 112

Figure 2B. Faults as mapped by others.

? Herd (1977)

? D. Smith (1981) air photo data

DD = left-laterally deflected drainage

B = bench

= scarp, barbed side down (s)

(S) = from D. Smith, 1981

(H) = from Herd, 1977

LIVERMORE VALLEY EARTHQUAKES

JAN 24 – FEB 26 1980

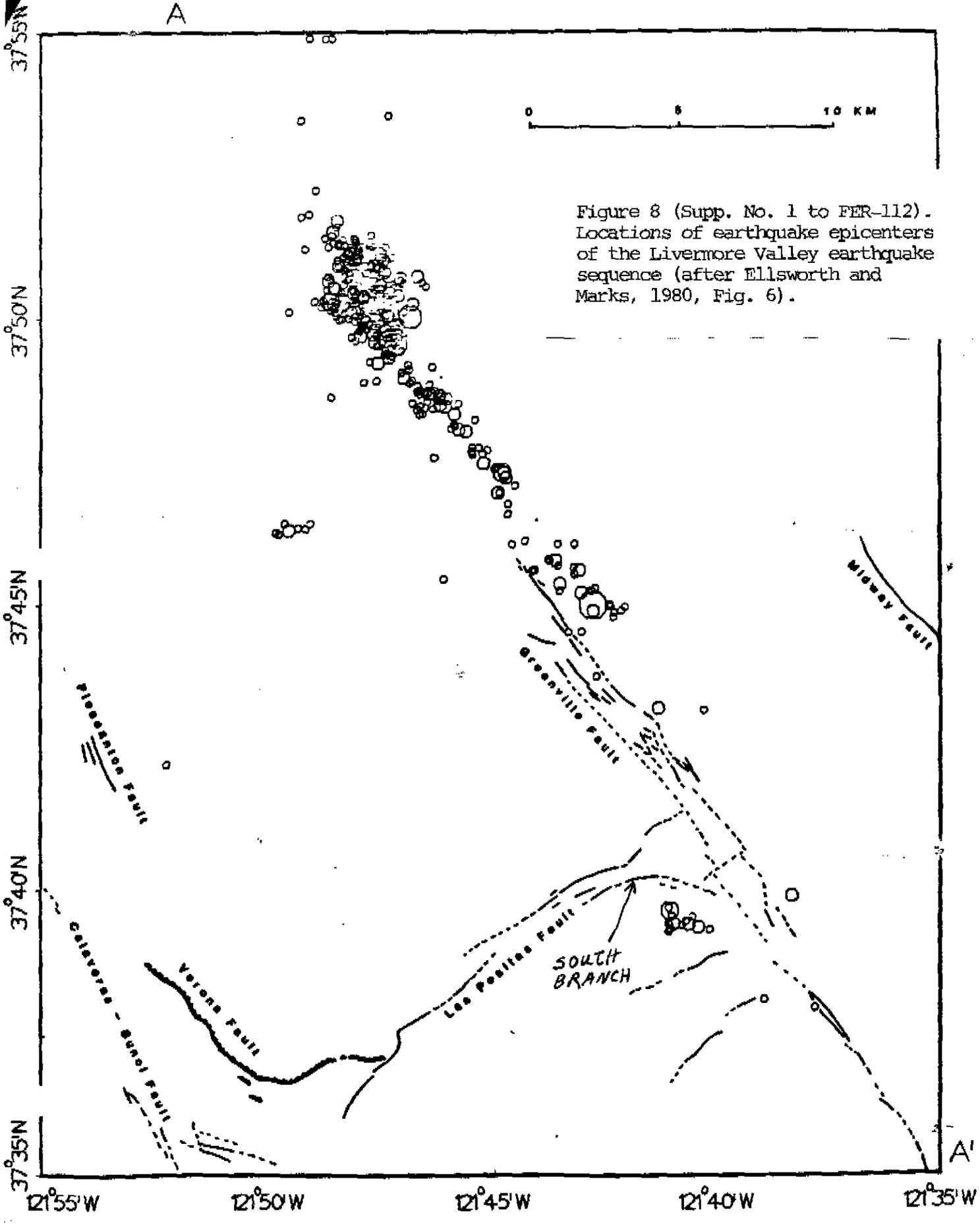
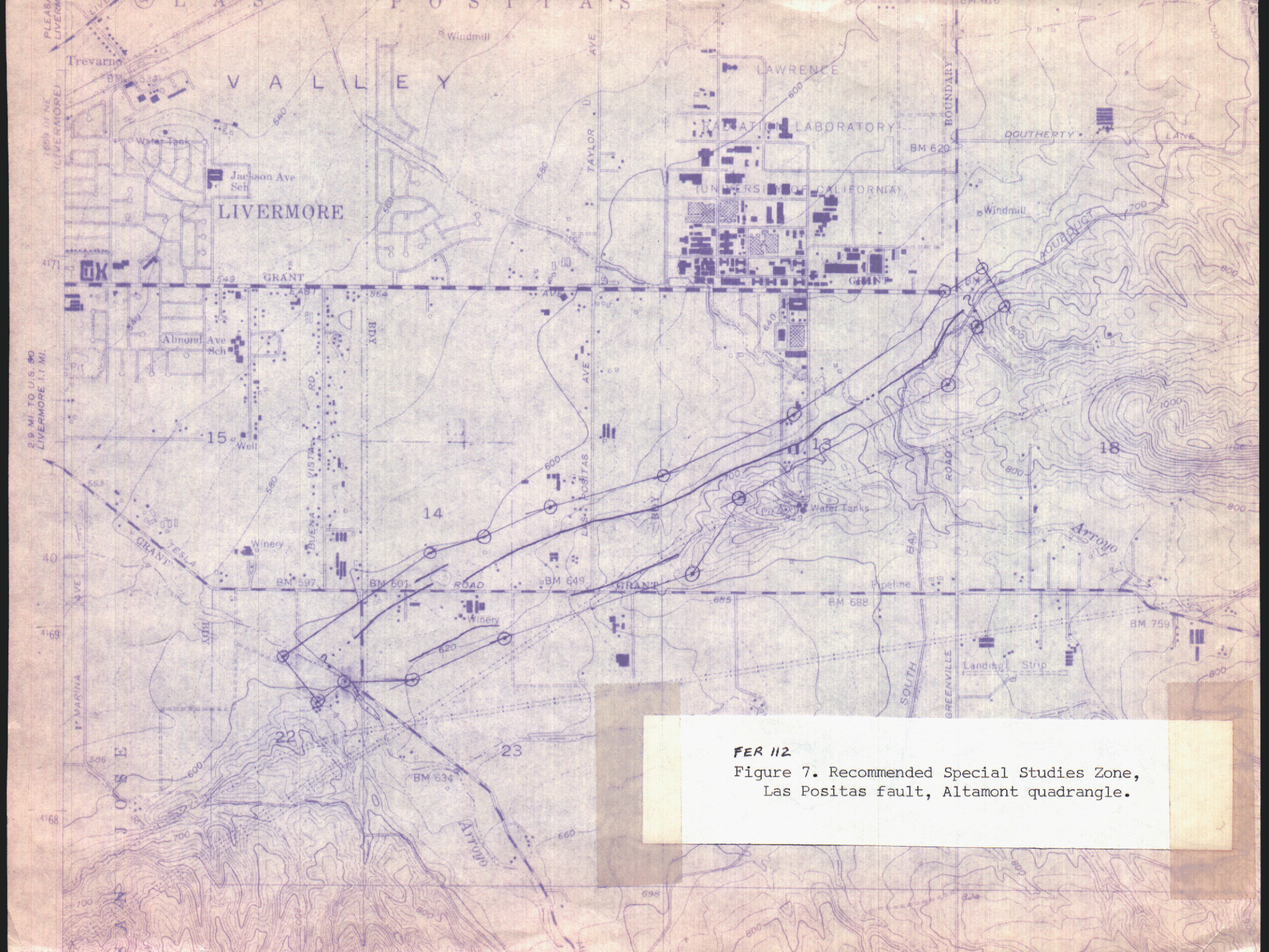


Figure 8 (Supp. No. 1 to PER-112). Locations of earthquake epicenters of the Livermore Valley earthquake sequence (after Ellsworth and Marks, 1980, Fig. 6).



FER 112

Figure 7. Recommended Special Studies Zone, Las Positas fault, Altamont quadrangle.

FER 112

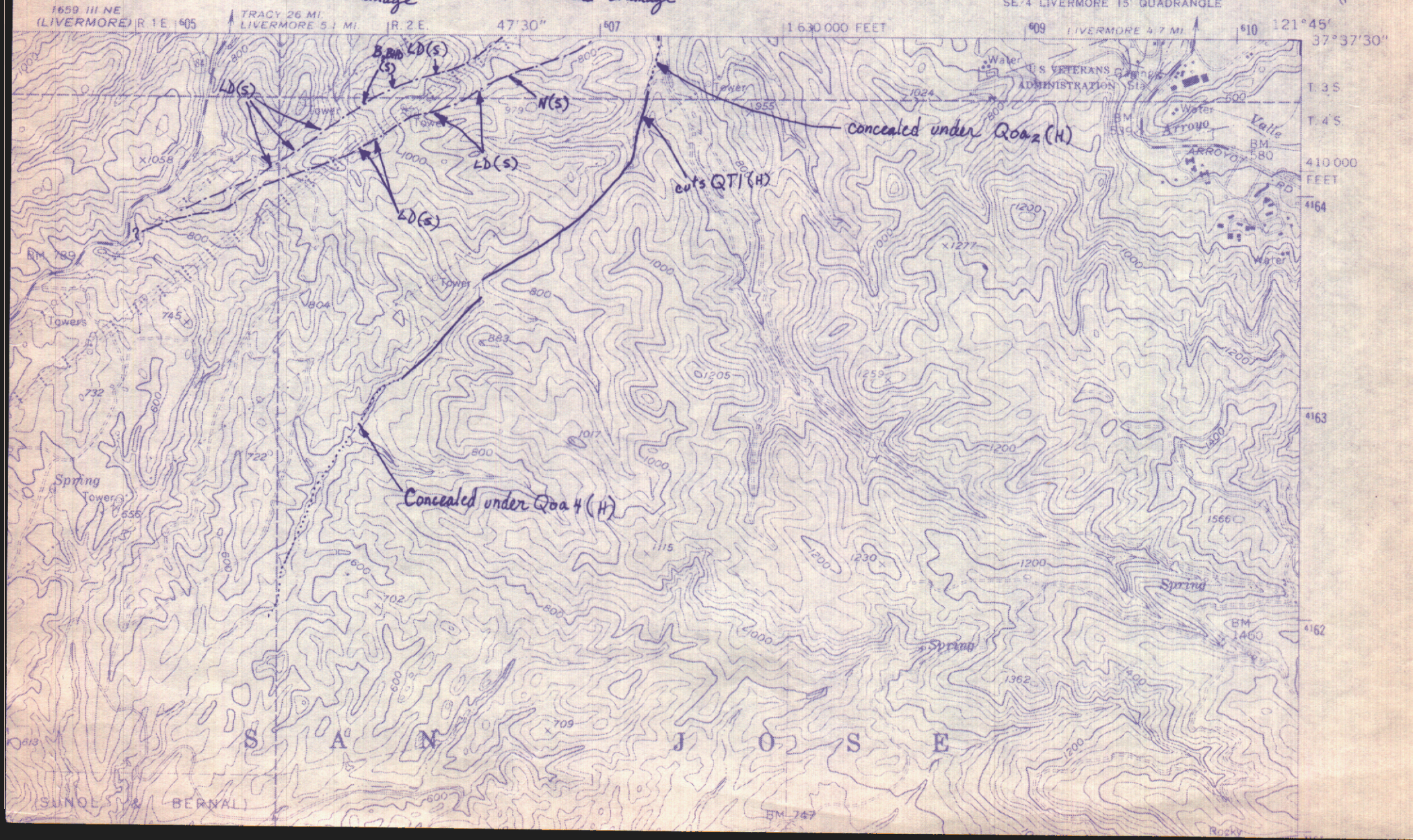
Figure 2C. Fault traces of other workers.

~···· Herd (1977)

~·-· D. Smith (1981)

(S) = from Smith
(H) = from Herd
LD = linear drainage

N = Notch
B = bench
BHD = beheaded drainage



FER 112
Figure 3C. Air photo interpretation (see Fig. 3A for explanation).